# ST. BARTHOLOMEW'S

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## INFLAMED INDIVIDUALISM

We are probably all of us hero-worshippers in one way or another, which is why we find the study of genius and the reading and writing of biography of such entertainment. A librarian of a large public library was always saying that the volumes in the shelf marked Biography were the first to wear out and that the reading public seemed to have followed the injunction of Disraeli: "Read no history; nothing but biography, for that is life without theory." This same librarian even thought, perhaps a little cynically, that one of the ways of becoming accepted as a great writer was to dissect and analyse the life of a popular hero. Indeed, the people who so avidly read biography remark somewhat in the same vein as those who prefer the stage to the cinema, that they would rather deal with real people.

Mostly biographers are content to describe the passage of their hero from his birth to his death-bed, watching that uncertain time, "as if when on a winter's night you sit feasting with your eldormen and thegns—a single sparrow should fly swiftly into the hall, and coming in at one door, instantly fly out through another." Occasionally perhaps the biographer may feel, as once Aldous Huxley, little less regard for chronological order when following some other motif in the design of his hero's life than merely growing old. But in a recent article* in the *Lancet* a rather different approach to biography has been undertaken. We have had many excellent and exhaustive descriptions of the life and works of Charles Darwin, but in this biography, for the first time, is a serious examination of Darwin's past medical history. Collected from his letters and biographies and from the people who knew him is the material to provide a very clear clinical picture of the psychoneurosis from which he suffered. So good a description is only obtained because Darwin lived among a family well-trained in observation and because nobody knew the origin of his affliction and thus did not think of withholding details from the biographers. He was, in fact, an invalid from a few years after his return from the voyage on the *Beagle* until his death about thirty-five years later. His illness carried unmistakable signs of an emotional disorder and it was his "accursed stomach" that was the chief offender.

The biographer then suggests that the expert on the adaptation to an environment by an animal was himself adapting to his own environment. His work was so important to him that invalidism provided the only convenient way to carry out his life desire, and avoid the meetings, dinners and social circle that would have kept him away from his work. The fact that he was an invalid provided him with a haven from the people and things that would merely waste his time and gave him the sleepless nights in which his restless mind was constantly stimulated. His psychoneurosis was an adaptation to succour his genius.

The reader's imagination is then stimulated by the author asking what would have happened had Darwin been treated by modern psychotherapy. When the psychoneurosis had been removed Darwin would recover health together with long nights of sleep and a steady round of meetings, social events and a return of his childhood enjoyment of Milton, Turner and Sullivan. His genius would be exposed

* Charles Darwin and Psychotherapy, by Douglas Hubble, M.D. *Lancet*, No. 5 of Vol. I., 1943.

to these incursions and biological science would have suffered a severe loss. Darwin's doctors did not cure him, they reassured him and encouraged him and allowed him to write the *Origin of Species*. Would modern medicine have had such success? With the biographer we must agree that "it is a terrifying thought that the Darwins of to-day may be known to posterity only in the case-books of the psychiatrists." May there be danger in the attempt at "typing" human minds with the electro-encephalogram, as Professor Adrian has prophecied may soon be commonplace, when endeavouring to fit men for so-called right job? There is surely more encouragement in the quotation with which the biographer heads his article: "The excellence of each is an inflamed individualism which separates him the more."

## JOHN ABERNETHY ON VITAL CAPACITY

By Professor R. V. CHRISTIE

John Abernethy believed "a deficient performance of the functions of the skin to be the principal cause of pulmonary consumption." It is true that he was a surgeon, but he came of a critical school, and his belief that respiration was as much a function of the skin as of the lungs was based on false experiment and the teachings of the times rather than ignorance. In *"An Essay on the Function of the Skin,"* published in the year 1793, Abernethy describes his researches on the respiratory function of this organ and it is very unfortunate that he chose this context for the following description of the Vital Capacity and its significance in Pulmonary Tuberculosis:—

"This disease which is the effect of chronic inflammation, steals insidiously upon the patient, and is often established beyond the possibility of removal, before its attack is even suspected. Yet I think, by physicians, its presence may be early known, since its effects are, to make the lungs less capacious. The capacity of the lungs admits of mensuration: let a person inspire as largely as he is able; let him then make a forcible and complete expiration; and expel the air into a receiving vessel: thus, the additional quantity of air that the lungs can receive by the most ample inspiration, is made visible. A glass bottle may be filled and inverted in water, and the patient may expire through a bent tube. Muscular debility, or spasm, may occasionally make the result of this experiment doubtful, yet in general, I believe it will afford useful information."

Crude measurements of the Vital Capacity had been made by Borelli in 1679 and later by James Keith in 1708, but the credit of applying this measurement to the study of disease is usually given to John Hutchinson, who published in 1846 his classical description of the clinical uses of the spirometer. It is not surprising that Hutchinson made no reference to the work of Abernethy as it would only be by chance that anyone interested in the Vital Capacity would read an essay on the Function of the Skin.

Although his views of the respiratory function of the skin may have been unorthodox, credit is due to Abernethy for this neat description of the measurement of the Vital Capacity and for being the first to suggest its possible significance in disease of the lung.

## MODERN CHEMOTHERAPY

By P. E. BALDRY

The introduction of the sulphonamide group of drugs has so revolutionised medical therapy, that a short time ago I became curious to discover their origin.

This story will be well known to medical men whose practice of medicine has extended over a number of years, but it occurred to me that perhaps there might be some of my contemporaries who, having arrived upon the field of medicine since 1935, would like to share my findings.

It was not long before I discovered that the father of modern synthetic chemotherapy was Paul Ehrlich. Ehrlich was a Jew born in Silesia in the year 1854.

At this stage in the century, organic chemists had become very actively engaged in the synthesis of chemical compounds. Two years

after Ehrlich was born, Perkin endeavouring to synthesise quinine, by chance, produced mauve, the first aniline dye. From this beginning a large series of such dyes were soon to be prepared, so that by 1877, when Ehrlich became qualified, Germany had already given to the world such important artificial colouring matters as eosin, methylene blue, and malachite green.

Medicine was not slow to utilise these dyes in the staining of bacteria, and Ehrlich chose as a thesis for his degree the subject of staining methods with the theory and practice of histological examination as elucidated by the use of stains.

His research abilities were soon recognised, and for the rest of his life he was given facilities to explore the unknown. This life of research which was coupled with a very close contact with clinical medicine can be conveniently divided into three periods.

In the first period, his attentions were concentrated upon staining tissues with these newly made aniline dyes and also upon the synthesis of new and better dyes. His contributions to medicine during this period were legion. Let it suffice to mention that it was he who first differentiated the white cells of the blood into neutrophils, eosinophils, and basophils, according to their staining properties. The beginning of intravital staining of nerve tissues by methylene blue, and the staining of Robert Koch's tubercle bacillus, by the technique involving acid discolouration, were due to him. As a result of this period of activity, it was soon obvious to Ehrlich that certain dyes have a selective affinity for certain cell groups, and even in an individual cell one dye has an affinity for the nucleus, while another for the cytoplasm.

His next period of research was devoted to the study of immunity and the production of anti-toxins. The fundamental researches of workers on toxins and anti-toxins, and above all von Behring's discovery of diptheria anti-toxin, led Ehrlich to develop new methods of anti-toxin formation, and he was the first to produce a serum of high anti-toxic power by performing repeated injections of the toxin into horses. His work on this subject became extensive and was recorded by him in book form in 1904. (Collected Studies on Immunity.) Ehrlich referred to anti-toxins as magic bullets, for each specific anti-toxin when injected into the body attacked and harmed nothing else save the toxin of the specific disease.

The observations, during the first period of his work, that dyes have a selective affinity for cells; and during the second period, that poisons in the blood stream were neutralised by specific chemicals; led him during his third period of research to discover drugs which could be injected into the body so as to adhere and to kill disease producing organisms, while doing as little damage as possible to the cells of the body. Up to this time efforts to combat invading organisms had been disappointing. Almost as soon as bacteria were discovered it was known that they could be destroyed by hundreds of chemicals when in vitro. When these chemicals, however, were introduced into the body they had little therapeutic effect, because they were general protoplasmic poisons, and combined with the cells of the body long before they reached the micro-organisms; in many instances doing more harm to the patient than good. Nevertheless, there were two facts which promised success for the future. One was that quinine had long been known to kill the malarial parasite, despite its harmlessness to human tissues; and the other, was that the administration of mercury compounds was know to influence the course of syphilis.

It is not surprising to learn in view of Ehrlich's former experiences, that he turned to dyes in his search for chemo-therapeutic drugs. He gained his first success in the April of 1904 with the dye trypan red. He injected this dye into mice suffering from a disease known as mal de caderas. This disease has a causative organism which is a protozoon of the same genus as the organism responsible for trypanosomiasis in human beings; the effect of the dye on this protozoon was very marked, but the dye proved too poisonous for general use. Nevertheless, it definitely proved that chemotherapy was a reasonable possibility.

At the time that Ehrlich, with his co-worker Shiga, were curing their infected mice with trypan red, Laveran (who had previously made his name by discovering the parasite of malaria in 1880) conceived the idea of combining trypan red with that well known poison arsenic, in the form of arsenious acid. This experiment proved to be highly successful.

The next important step was to be taken by a Canadian, W. H. Thomas, working at the Liverpool School of Tropical Medicine. This step was to employ an organic compound of arsenic alone, and in 1905 Thomas found one that was trypanocidal to mice, and suggested its use in the treatment of sleeping sickness. This compound had as a matter of fact been put on the market in Germany in 1902 as a treatment of anæmia and skin diseases, and at this time

Ehrlich had investigated its trypanocidal properties, but discarded it as useless. Therefore, when Thomas published his results, Ehrlich came across to Liverpool to inspect his work. At the end of his visit Ehrlich came to the conclusion that he must have used a strain of trypanosomes resistant to arsenic. He returned home with greater faith in arsenical compounds, and proceeded to synthesise many hundreds of combinations, culminating in his discovery of "606," or salvarsan. This was found to cure mice affected with trypanosomiasis, and was the least toxic drug so far produced for this purpose; but Hata, one of Ehrlich's co-workers, showed that it would also cure animals innoculated with the spirochætes of syphilis. After careful experiments Ehrlich allowed it to be given to human patients. The results were remarkable, and in April, 1910, he was able to announce to the Congress for Internal Medicine at Wiesbaden that salvarsan was a specific cure for syphilis.

The synthesis of arsenical compounds was continued by many workers, and again in 1919, another success was scored; this time in America, when Heidleberger and Jacobs discovered tryparsamide.

Whenever such a discovery is made, one can be sure that it has meant the synthesis of literally hundreds of compounds, together with extensive animal experiments, before the best drug for the purpose has been produced. The reason for this is that in the realm of chemotherapy there is no knowledge of the real mode of action of these drugs, and hence no rules to guide our efforts. It is purely a matter of trial and error, and it is the occasional success standing out as a monument of patience, technical skill and luck that ensures that the task is worth while.

Ehrlich initiated this method of attack upon germs, but it was not long before his lead had stimulated other workers to think and act in a similar manner. In 1906, Mesmil and Nicolle of the Institut Pasteur showed that a dye closely related to trypan red gave better results against the trypanosomes. This was trypan blue, and in the same year synthesized another variant, afridol violet. This had a NH.CO. group between the two halves of the molecule. This was the start of a series of investigations carried out by Bayer Products Ltd., which culminated in the production of a colourless substance with no less than five NH.CO. links, and announced to the world in 1920 as Bayer 205.

It is impossible and in fact unnecessary for our purpose to enumerate the many potent chemotherapeutic drugs discovered during the early part of this century. The position up to 1935 was well summed up by Pro. Hörlein when he addressed the Royal Society of Medicine in the October of that year. At this meeting he pointed out that the possibility of combating infectious diseases with chemotherapeutically active substances depended to a large extent on the structure of the pathological organism. Apart from the cure of contagious pleuro-pneumonia in horses with neo-salvarsan, there was as yet no chemotherapeutic substance which was active in virus diseases. The position was scarcely better when the cocci and bacilli were considered. These two types of infective organism occupied the lowest level in the scale of micro-organisms. On the other hand, the spirochæte which also belongs to the bacteria group, and the more highly developed pathogenic organisms, such as the protozoa, appeared to offer more points for attack, because by 1935 there was hardly a protozeal disease of man, or spirochætal disease, that could not be cured by early treatment with the appropriate synthetic drug. Pro. Hörlein then stated that a new compound, prontosil, had recently been discovered which had been shown to have a chemotherapeutic effect on streptococcal infections. The story of the discovery of prontosil must now be told.

It starts in 1927 when a very able pathologist interested in this work was appointed Director of Experimental Pathology and Bacteriology at the Elberfield laboratories of that gigantic concern, I.G. Farbenindustrie, of which Messrs. Bayer are a subsidiary. His name was Gerard Domagk.

Domagk, since the last war, had devoted much of his attentions to the reticulo-endothelial system. He was well aware that these cells in the body successfully combated invading bacteria, and postulated that this was done by means of a chemical poison. However, when he attempted to isolate the chemical from the body tissues, he failed. He next tried to synthesise a drug which would have the same effect. It is interesting to learn that he returned in this quest to those chemical compounds which had given Paul Ehrlich so great an initial success, the aniline dyes. There was good reason for this, because already promising results had been obtained by other workers.

In 1913, Eisenberg had first employed azo dyes (i.e., dyes containing an -N=N-group) in chemotherapy, when he noticed that the yellow azo dye, chrysoidin, had marked antiseptic powers in vitro, but was disappointing in vivo.

Better results were obtained by Ostromislenski, who produced an azo dye analogous to but more basic than chrysoidin, which he called pryidium. Pryidium proved to be not only more effective in vitro but also to have an effect against gram positive bacteria in vivo.

In 1919, another important contribution was made when Heidleberger and Jacobs engaged upon an attempt to increase the bactericidal properties inherent in the quinine molecule linked di-methylated di-hydroquinone with diazo compounds containing sulphonamide groupings (i.e., $SO_2$ $NH_2$ groups). However, none of these compounds showed marked actions in vivo, although most promising in vitro.

These sulphonamide groups in azo dyes were not new to organic chemists. As far back as 1909, Hörlein, Dressel and Kothe, engaged upon the production of new dyes for textile purposes, had found that dyes which contained sulphonamide and substituted sulphonamide groups were far and away superior to any others, because of their degree of fastness to washing, owing to their extremely firm adherence to wool fibres.

It was with the results of these workers in mind that Domagk collaborated with two organic chemists, Mietzsch and Klarer. These chemists, under his direction, prepared large numbers of azo dyes, while he carried out the most painstaking tests on their preparations. After the production of many hundreds of these dyes, Mietszch and Klarer produced one with a sulphonamide group in it, which Domagk found had a definite curative effect on mice affected with streptococci. This was the best drug produced so far, but was it the best possible? This question could only be answered by producing more and more azo dyes with sulphonamide groups, and comparing each one with carefully controlled experiments.

It was during this gigantic piece of research that Mietzsch and Klarer reverted back to the original dye used by Eisenberg in 1913, and attached a sulphonamide group to chrysoidin. When Domagk tested this new substance, the results far excelled any previously tried drug. In fact, he considered the results too good to be true, and so he very cautiously experimented with it over and over again; first with animals and then on patients. The drug was first synthesised in 1932, but it was not until 1935 that he announced it to the world under the name of "Prontosil."

The medical world was quick to realise the potentialities of this new drug, but with a sobriety which is characteristic of modern scientific investigations, the drug was carefully tested against controls by many workers. As a result of such investigations, in 1936 Tréfoul, Nitti, and Bovet, announced that the drug owed its bactericidal action not to the fact that it was a dye at all, but in virtue of the fact that in the body it was broken down, and that the active constituent was para-amino-benzenesulphonamide. This colourless crystalline substance had been known to the world since 1908, when Gelmo had prepared it as just one more chemical compound! It was soon found that this colourless substance had as good therapeutic effects as the red dye prontosil, and had the added advantage that it was not protected by patents, and was cheap to make. It is now known to the medical world as sulphanilamide.

Ehrlich started the quest with dyes and found salvarsan. Domagk in a similar manner began with dyes, and by his leadership the world was given sulphanilamide. Since the birth of sulphaniladmide organic chemists all over the world have been endeavouring to produce other efficient drugs so that as many of the known types of bacteria as possible can be overcome. The progress that has been made is common knowledge, but it is important to realise that it has only been achieved by a laborious process of trial and error. The only method open to them has been to replace part of the basic structures by new organic groups. Some idea of the magnitude of the task can be gained when it is remembered that in the sulphanilamide molecule alone, there are many places where substitution might take place, and also that the number of organic groups which might be employed is legion. For instance, before Messrs. May and Baker produced sulphapyridine by the replacement of one of the hydrogen atoms by a pyridyl group in the sulphanilamide molecule much time had already been spent in putting organic groups elsewhere in the molecule without marked success, and also in using hundreds of groups in the position where they finally put the pyridil group. It will not be until we have more precise knowledge of the action of these drugs on bacteria in the body that this task of synthesis will be lightened.

The scientific world wished to show their appreciation to Domagk by awarding to him the Nobel Prize. This, however, was not to be as is shown in an interesting paragraph which appeared in the Manchester Guardian Weekly on December 15th, 1939. It read:—"Five Nobel Prizes have just been awarded, and their

bestowal raises some interesting points. They are divided among six scientists, three of whom are German. The German Government announced at the time of the award of the Nobel Peace Prize to Herr Von Ossietsky, that henceforth Germans would not be allowed to accept Nobel prizes, and according to the German Legation at Copenhagen this ruling still applies."

One of these Germans was Gerard Domagk.

Denied this high honour by his Government he has, however, received a much more personal reward, partly in so much as he has been primarily responsible for the saving of countless lives, but also because in the early experimental days of prontosil, he was able to save the life of his own daughter. The occasion arose when she developed a spreading cellulitis after having run a needle into her hand. All kinds of treatment were instituted but without avail. It soon became obvious that the girl had not long to live, when as a desperate measure, some of the new and scarcely tried drug was administered. The effect was remarkable and it was not long before she made a complete recovery. There must be few times in the history of mankind when a research worker has gained benefit from his invention in such a happy manner.

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## THE ALPINE CLUB

Since the outbreak of war it has not been possible for the Club to hold its usual dinners and meetings, so little has been heard about the activities of its members. For the benefit of past and present members of the medical staff and students, it seems desirable to call attention to the existence of the Club.

In normal times the Bart.'s Alpine Club holds informal dinners several times a year. At these meetings it has been customary to have a lecture, illustrated by lantern slides or a cinematograph film, after the dinner. The lectures are usually given by members of the club; though sometimes an eminent skier, mountaineer or explorer is invited as a guest to lecture.

The Club caters for the interests of two groups of people, namely, mountaineers and skiers; and membership is open to any student of the hospital, or past or present member of the medical staff, who is interested in these sports. Apart from attending the ordinary club meetings, certain members were in the habit of forming "meets" for the purpose of going climbing in the British hills. These meets have been held in the mountains of North Wales and the Lake District, and have proved to be a very successful side to the activities of the Club.

Although the regular meetings have had to be abandoned since the outbreak of war for obvious reasons, a few of us have, nevertheless, found it possible to go climbing together from time to time. In November, 1939, four members spent a week together in Borrowdale, when some fell walks and a few climbs were made, both there and in the Wasdale region. In April, 1940, two members visited North Wales and climbed on Trypan, the Idwal slabs and Llwedd. In 1941 two members visited Langdale. And in September, 1942, the Club was represented at the very successful meet of the Alpine Club held in Langdale, by two of its members. On this occasion climbs were made on Pavey Ark, Gimmer Crag and Beau Fell Buttress in that region; and on Dow Crag, Pillar Rock and Great Gable in outlying districts.

Perhaps it is worth recording that members of the Bart.'s A.C. have served on the committee of the Alpine Club during recent years. In 1940 and 1941 we had one representative on that committee, namely, Dr. Charles Hadfield; in 1942 two, Dr. Hadfield and Dr. N. S. Finzi; and now in 1943 we have three members on the Alpine Club committee, namely, Dr. N. S. Finzi, Mr. M. Harmer and Dr. C. B. M.

Warren.

Many of our members are at present with His Majesty's Forces, and some have been able to turn to account their knowledge of mountain craft in the present circumstances. Major J. Joyce having escaped at Dunkerque, was heard of after at a mountain warfare school in Britain, since when he has gone to North Africa. Here we understand he can see the distant Atlas, but so far has been too preoccupied with his duties to visit them for climbing. Lt.-Col. E. R. Cullinan is somewhere in the Middle East and it is doubtful whether he has had any opportunities to vent his enthusiasm for rock-climbing. Mr. Alan Hunt is a Major in the R.A.M.C., and our secretary, Sgn. Ltn. John Gash, is serving in the R.N.V.R.

It is sad to have to record the death of our distinguished member, Eadric Fountoine. Fountoine was killed as the result of a motor accident while on active service with the Winter Warfare School in Iceland. He had acquired a special knowledge of the conditions of arctic travel through going as a member of Lawrence Wager's expedition to East Greenland before the war, on which occasion he was one of the party who succeeded in reaching the summit of Mount Forel, believed to be the highest peak in the Arctic. At the outbreak of the war he was away with Eric Shipton climbing and exploring in the Korahoram range. When this expedition had to return before finishing their explorations, Fountoine joined the R.A.M.C. and was sent to Narvik. When last on leave he recounted how, when going to Narvik, his transport had steamed close to the Loffoten Islands, which he had visited with a climbing party, composed of members of the Bart.'s A.C., in 1935. Fountoine will be greatly missed from the future meetings of our club.

It will be realised, from this account, that the climbing section of the Club has not been altogether inactive during the past three and a half years. We must regret, however, the lack of opportunity afforded to our ski-ing members for the practice of their sport; but look forward to the day when both sections of the Club will be able to visit the mountain ranges outside Britain when the war is over.

If there are any students or members of the medical staff who are interested in rock-climbing or fell-walking, and who might like to join such parties as it is possible to get together from time to time for such purposes, they should try to get in touch with one of the following:—Dr. N. S. Finzi, Mr. M. Harmer, or Dr. C. B. M. Warren.

CHARLES WARREN.

## *BEVERIDGE AND MEDICAL PRACTICE*

A meeting of the Metropolitan Counties Branch of the B.M.A. was held on Sunday afternoon, May 16th, at B.M.A. House, Tavistock Square, Sir Crisp English in the chair. The subject of the meeting was *Beveridge and Medical Practice.* The large Central Hall and gallery were crowded with medical practitioners who had come to hear a report from Dr. Charles Hill, Deputy Secretary of the B.M.A., of the preliminary discussions which had already taken place between representatives of the B.M.A., the Royal Colleges and other bodies, and the Minister of Health and his representatives.

Dr. Hill gave a lucid exposition of the facts of these discussions, and a description in broad outline of the course they had pursued up to date. He deprecated the haste with which these discussions had been undertaken and pursued at a time when the nation's over-riding concern was in winning the war, and when 17,000 doctors on Active Service (including a large proportion of the younger men) were unable to express their opinion on the crucial issues involved. He did not think that the Government's decision to deal first with Assumption B of Part VI of the Report (Social Security and Social Policy—Comprehensive Health and Rehabilitation Services) was due to opinion that a section of the community represented by 50,000 doctors would be the most easily dealt with, nor did he think that the present medical services of the nation were so derelict as to justify immediate and impulsive action which would involve drastic changes in the whole of medical practice. Dr. Hill was of opinion that the Government's decision to take Assumption B first in its approach to the Beveridge Report is due to the fact that the financial stability of the whole Plan depends on control of certification, that is to say, Government control of the doctors who give the certificates. Sir William Beveridge refers to the fact that " The measures for control of claims

to disability benefit—both by certification and by sick visiting—will need to be strengthened, in view of the large increases proposed in the scale of compulsory insurance benefit . . ." In another part of the Report reference is made to the need for "finding a health service which will diminish disease by prevention and cure, and will insure the careful certification needed to control payment of benefit at the rates proposed in this Report." Dr. Hill pointed out that a departure from established practice is here involved, namely, medical certification which takes into primary account the benefits received as result of a medical certificate, an attitude which is contrary to medical practice and professional ethics, since the doctor's first duty is to his patient and not to the State, and his certificate depends on the patient's health and ill-health.

Dr. Hill's second major point against the Minister's proposals had regard to the newly qualified man who, having been accepted for medical service by the Central Advisory Board, required them to apply to Local Authority for an appointment. In the event of there being little or no opportunity for private practice in the future it seemed that whether or not a medical man should or should not be given the opportunity to practise medicine, to qualify for which he would already have spent several years at considerable expense, would actually depend on Local Authority decision. Further, his income would increase by regular increments according to years of service, and not according to professional zeal or ability, and his professional status would depend on Local Authority decision rather than the opinion formed of his work by his patients and professional colleagues.

It will be seen from this briefest summary of Dr. Hill's statement that matters of principle involving professional status and ethics were singled out for emphasis and discussion. Proposed rates of pay in the proposed medical service, compensation for practices, opportunities for post-graduate study, pensions and other details were referred to, but they were rightly treated as being of relatively minor importance. Dr. Hill ended what was generally recognised as a clear and brilliant speech by a plea to his audience for the understanding of the important issues involved, and a trust in the integrity and leadership of the representatives of the medical profession, to whom had been entrusted the responsibility of securing the provision of the best medical service for the nation.

There is no doubt that Dr. Hill carried his large audience with him, and his speech supplied a tonic which the profession needs. Doctors as a whole are rather tired. Each carries a considerable and personal responsibility. It is not sufficiently realised that a doctor provides a day and night service for his patients. He is subject to calls on his services at night, and in addition to the planned day's work there are constant telephone calls, some of which amount to consultations. Doctors are fully aware of the fact that the medical services of the country must be improved, and they have done their best for years past to secure Government interest in the more obviously needed reforms and improvements. As Dr. Gregg (who followed Dr. Hill) said, the Insurance Acts Committee has repeatedly pressed on the Ministry of Health the need for the provision of consultant, specialist and ancillary services within the framework of State insurance, and at the same time it has asked for the inclusion of the dependants of insured persons. The Ministry has been deaf to these appeals. Medical practitioners are sensitive to the continued criticism of the service they render to the public, service which is as sincere as that rendered to the community by any other body of its citizens, service which knows no limit of hours of work, and taking into account that in the case of many practitioners it means working seven days a week, including Bank Holidays, it is generally felt that the criticism is unjustified. Some of this criticism comes from uninformed sources; some of it is inspired by political prejudice; unfortunately some of it comes from within the ranks of the profession, particularly from one or two eminent men who should be leaders in the efforts to improve the conditions under which doctors do their work. As a subsequent speaker pointed out, prejudice against the medical profession is unfortunately created in Part I, paragraph 3, of the Beveridge Report by the statement that "in one respect only of first importance, namely, limitation of medical service, does Britain's achievement fall seriously short of what has been accomplised elsewhere." We English people are inclined to look at our own efforts and accomplishments with a myotic eye, and extol the activities of foreigners. As a fact, however, the medical service rendered to the public is better than that available to any other community in the world, as shown, for instance, in the low record of hours lost to industry by absenteeism due to sickness and accident in Great Britain.

GEOFFREY EVANS.

# THE CYCLOTRON

*Or What the Modern Doctor Ought to Know*

With all the recent talk about overburdening the curriculum for the unfortunate student, it was amusing to read in the *British Medical Journal* recently (May 1st, 1943) a leader about the Cyclotron. Towards the end of the first column the following remarkable equation (if it can be called an equation), is quoted: ${}_1H^2 + {}_{15}P^{31} \rightarrow {}_1H^1 + {}_{15}P^{32} \rightarrow {}_{16}S^{32} + {}_{-1}e^0$. Few doctors, I should think, can do much better than $Zn + H_2SO_4 = ZnSO_4 + H^2$ and this plethora of little figures is enough to set one back a long way. But fortunately it is perfectly simple. All it means is that the neutron of a highspeed deutron is captured by a phosphorus nucleus and the radio-active phosphorus then emits a $\beta$-particle (or electron) with 1.7 M.E.V. energy and becomes sulphur. M.E.V., it should be unnecessary to add, stands for million electron-volts. "Atomic transformations," says the B.M.J. chattily, "result in excited atoms." And the excitement isn't all amongst the atoms, either. For many centuries men have tried to chivvy one element into another, preferably gold, and now it seems this has become almost commonplace.

The newest Cyclotron will have a magnet weighing 4,000 tons and will produce 100 M.E.V.s. It makes one feel almost sorry for the little machine under the mulberry tree in the Square. Huge fields, magnetic and otherwise, are opened up for those whose object it is to convert mass into energy, a phenomenon which will doubtless one day be utilised for the destruction of Man by Man. Until then let us salute these magicians . . .

Hail! Scientists whose toil and sweat and tears
have gained fruition over many years:
Hail! Cyclotron, this modern masterpiece,
happy are we, to have such things as these.
Most happy, for the secret of the atom
is situated in its Nuclear Pattern.
Consider then through medieval mists
th' activities of the Alchemists,
Who often taught and just as often told
the hundred different ways of making gold.

Their success
was sometimes more and sometimes rather less.
Victorious or defeated, either state
it was their wont to celebrate.
But now, my Muse, assist me to portray
men of a very different sort of clay;
Men who hour after weary hour devote
to the production of an isotope.

They devise
instruments of the most gigantic size
Between whose magnets atoms may be split
and there dissected slowly bit by bit.
For well they know that what the gods deny
Nuclear Transformation may supply.
Beryllium a deuteron may swiftly seize
yielding (surprisingly) Boron and ten M.E.V.s.
But Time and Space are passing and my verse,
the longer it proceeds, becomes the worse.
Mass disappears and Energy shall take its place:
Possibly this achievement will annihilate the
Race.

HOGARTH.

# A NEW POLICY FOR MEDICINE

*On Modern Agriculture and its Application to Medicine.*

By Sir Albert Howard

When asked to contribute an article to this journal on the medical aspects of soil fertility, it appeared to me that I could not do better than indicate the bearing of a soil in good heart on the nutrition and health of crops, livestock and mankind, and in doing so to give samples of the evidence in support of the thesis that the true basis of the public health system of to-morrow is a fetile soil, *i.e.*, one rich in freshly prepared humus.

As will be seen in what follows, while there is a considerable body of evidence for the view that a fertile soil means healthy crops, healthy livestock and last, but not least, healthy human beings, nevertheless before legislative action can be taken the case needs more examples demonstrating the great effect of the fresh produce of fertile soil on the health of communities—like schools, training centres and factories—which control sufficient areas of land, on which the bulk of their food can be produced. A few such examples are available; more are in the making; still more are necessary. Nevertheless, the case as it stands is a very strong one and many practising members of the medical profession consider that the time has come to look at medicine from a new aspect—the restoration and maintenance of health rather than the cure of disease. An even more vital aspect is the initial establishment of the stamina of infants by their mothers, prior to their conception and birth. As this point of view becomes general, it follows that the basis of the medical teaching of to-morrow will have to be broadened to include the study of mankind in relation to his environment. The physician will then become a naturalist in the best and widest sense. His main work will be to see that the population enjoy their birthright—health: a subsidiary pre-occupation—the present-day treatment of disease—will become less and less important as the years pass. As preventive medicine becomes firmly established on solid foundations, the scope of the physician's work will therefore be broadened and his usefulness and standing in the community will improve out of all knowledge. To-day the doctor expends his energies on individual tasks—the treatment of casualties, which never need occur, an ever recurring task: to-morrow he will devote his powers to constructive work—the development of the nation's greatest possession—its population. To accomplish all this far-reaching changes in the long-range outlook of medical teaching will become necessary. This will also involve a drastic re-organisation of research work now in progress.

In presenting the evidence in favour of a new policy for medicine I propose to begin with my own experience of disease in crops and livestock, which has covered a period of over forty years spent in agricultural research in many parts of the world. Afterwards the bearing of soil fertility on national health will be discussed.

### *Disease in Plants*

I took up research in agriculture as a mycologist in the West Indies in 1899, where I specialised in the diseases of sugar-cane and cacao and became interested in tropical agriculture. Almost at once I discerned a fundamental weakness in the research organisation: the mycologist had no land on which he could take his own advice about remedies before asking planters to adopt them.

My next post was botanist at Wye College in Kent, where I was in charge of the experiments on hops and had ample opportunities for studying the insect and fungous diseases of this interesting crop. But again I had no land on which I could try out certain ideas that were fermenting in my mind about the prevention of hop diseases.

In 1905 I was appointed Imperial Economic Botanist to the Government of India. At the Pusa Agricultural Research Institute I had for the first time all the essentials for work—interesting problems, money, freedom, and, last but not least, 75 acres of land on which I could grow crops in my own way and study their reaction to insect and fungous pests and other things. My real training in agricultural research then began—six years after leaving the University and obtaining all the paper qualifications and academic experience then needed by an investigator.

At the beginning of this second and intensive phase of my training I resolved to break new ground and try out an idea (which first occurred to me in the West Indies), namely, to observe what happened when insect and fungous diseases were left alone and allowed to develop unchecked, and where indirect methods only, such as improved cultivation and more efficient

varieties, were employed to prevent attack. This point of view derived considerable impetus from a preliminary study of Indian agriculture. The crops grown by the cultivators in the neighbourhood of Pusa were remarkably free from pests of all kinds; such things as insecticides and fungicides found no place in this ancient system of agriculture. I decided that I could not do better than watch the operations of these peasants, and acquire their traditional knowledge as rapidly as possible. For the time being, therefore, I regarded them as my professors of agriculture. Another group of instructors were obviously the insects and fungi themselves. The methods of the cultivators if followed would result in crops practically free from disease; the insects and fungi would be useful for pointing out unsuitable varieties and methods of farming inappropriate to the locality.

In order to give my crops every chance of being attacked by parasites, nothing was done in the way of prevention; no insecticides and fungicides were used; no diseased material was ever destroyed. As my understanding of Indian agriculture progressed, and as my practice improved, a marked diminution of disease occurred. At the end of five years' tuition under my new professors—the peasants and the pests—the attacks of insects and fungi on all crops, whose root systems were suitable to the local soil conditions, became negligible. By 1910 I had learnt how to grow healthy crops, practically free from disease, without the slightest help from mycologists, entomologists, bacteriologists, agricultural chemists, statisticians, clearing-houses of information, artificial manures, spraying machines, insecticides, fungicides, germicides, and all the other expensive paraphernalia of the modern Experiment Station.

I then posed to myself the principles which appeared to underlie the diseases of plants:

1. Insects and fungi are not the real cause of plant diseases, but only attack unsuitable varieties or crops imperfectly grown. Their true rôle is that of censors for pointing out the crops that are improperly nourished and so keeping our agriculture up to the mark. In other words, the pests must be looked upon as Nature's professors of agriculture: as an integral portion of any rational system of farming.

2. The policy of protecting crops from pests by means of sprays, powders, and so forth is unscientific and unsound, as, even when successful, such procedure merely preserves the unfit and obscures the real problem—how to grow healthy crops.

3. The burning of diseased plants seems to be the unnecessary destruction of organic matter, as no such provision as this exists in Nature, in which insects and fungi, after all, live and work.

This preliminary exploration of the ground suggested that the birthright of every crop is health, and that the correct method of dealing with disease at an Experimental Station is not to destroy the parasite, but to make use of it for tuning up agricultural practice.

*Disease in Animals*

Steps were then taken to apply these principles to oxen, the power unit in Indian agriculture. For this purpose it was necessary to have the work cattle under my own charge, to design their accommodation, and to arrange for their feeding, hygiene, and management. At first this was refused, but after persistent importunity, backed by the powerful support of the Member of the Viceroy's Council in charge of agriculture (the late Sir Robert Carlyle, K.C.S.I.), I was allowed to have charge of six pairs of oxen. I had little to learn in this matter, as I belong to an old agricultural family and was brought up on a farm which had made for itself a local reputation in the management of cattle. My work animals were most carefully selected and everything was done to provide them with suitable housing and with fresh green fodder, silage, and grain, all produced from fertile land. I was naturally intensely interested in watching the reaction of these well-chosen and well-fed oxen to diseases like rinderpest, septicæmia, and foot-and-mouth disease which frequently devastated the countryside.* None of my animals were segregated; none were inoculated; they frequently came in contact with diseased stock. As my small farmyard at Pusa was only separated by a low hedge from one of the large cattle-sheds on the Pusa estate, in which outbreaks of foot-and-mouth disease often occurred, I have several times seen my oxen rubbing noses with foot-and-mouth cases. Nothing happened. The healthy well-fed animals reacted to this disease exactly as suitable varieties of crops, when properly grown, did to insect and fungous pests—no infection took place.

As the factors of time and place are important when testing any agricultural innovation, it now became necessary to try out the three principles referred to above over a reasonably long period and in new localities. This was done during the next twenty-one years at three centres: Pusa (1910-24), Quetta (summers of 1910 to 1918), and Indore (1924-31). The results obtained at these three centres more than confirmed the preliminary observations described above.

* These epidemics are the result of starvation, due to the intense pressure of the bovine population on the limited food supply.

In one direction—virus disease—new ground was broken. This was observed on tobacco. When care was devoted to the details of growing the seed, to the raising of the seedlings and to transplating, as well as to the humus content of the soil, this disease soon disappeared and for nearly fifteen years not a single diseased plant was observed. Nothing was done in the way of prevention beyond good farming.

One significant factor was common to all these results—namely, the rôle of well-made farmyard manure for maintaining soil fertility, which in turn appeared to be the basis of health.

*Humus and Disease Resistance*

Even on the experiment stations in India the supply of farmyard manure was always insufficent. The problem was how to increase its volume and to improve its quality. The solution was suggested by the age-long practices of China. It involved the study of how best to convert animal and vegetable wastes into humus, so that every holding in India could become self-supporting as regards humus. But such a problem did not fall within my sphere of work—the improvement of crops. It obviously necessitated a great deal of chemical work under my personal control. The organisation of research at Pusa, however, had gradually become more rigid; the old latitude which existed in the early days became a memory. That essential freedom, without which no progress is possible, had been slowly destroyed by the growth of a research organisation based on fragments of science, rather than on the practical problems which needed investigation. The instrument became more important than its purpose. Such organisations, of course, can only achieve their own destruction. This was the reason why I had to leave Pusa and spend some precious years in collecting the funds to found a new centre where I should be free to follow the gleam unhampered and undisturbed. All this took six years—1918 to 1924—before the Indore Institute of Plant Industry, at which cotton was to be the principal crop, could be founded. Now the fundamental factor underlying the problems of Indian cotton was none other than the raising of soil fertility. I might, therefore, kill two birds with one stone. I could solve the cotton problem if I could increase the amount of farmyard manure for India as a whole. In due course a simple method, known as the Indore Process of composting vegetable and animal wastes, was devised, tested and tried out on the 300 acres of land at the disposal of the Institute of Plant Industry, Indore. In a few years production more than doubled, the cotton crops in particular were to all intents and purposes immune to disease. In 1931 the results were published by the Oxford University Press in book form under the title—*The Waste Products of Agriculture: Their Utilisation as Humus.* In this work I was ably assisted by one of my Indian staff—Mr. Y. D. Wad—the junior author of the final report.

Since 1931 steps have been taken to get the Indore Process tried out all over the world, at first by the great plantation industries—coffee, tea, sugar, sisal, maize, cotton, tobacco and rubber—and later, in farming and gardening. The results have confirmed and indeed have extended those obtained at Indore.

It soon became evident that the time had come to set out the whole humus case in such a manner that a new foundation for agricultural research could be established, which could replace the present organisation based on the fragments—the separate sciences—of a great biological complex. This took the form of *An Agricultural Testament,* which was published by the Oxford University Press in June, 1940, and reprinted two years later in June, 1942. In 1943 two more reprints have become necessary.

This book has led to important developments overseas, notably in South Africa, New Zealand and the United States of America, in all of which new ground is being constantly broken. The progress made can be followed by consulting the following four periodicals:

(1) *The Farmer's Weekly* of South Africa (P.O. Box 387, Bloemfontein, S.A.).
(2) *The News Letter on Compost,* published three times a year by the County Palatine of Chester Local Medical and Panel Committees at Holmes Chapel, Cheshire.
(3) *The Compost Club Magazine* of New Zealand (P.O. Box 1303, Auckland, N.Z.).
(4) *Organic Gardening and Farming* (The Rodale Press, Emmaus, Pa., U.S.A.

*The Mycorrhizal Association and Disease.*

Why is humus the basis of disease resistance and of fertility in the crop and also in livestock? The circulation of protein in Nature and the mycorrhizal association provide the clue.

Let us first consider the significance of the circulation of protein. The first stage in this process is the synthesis of humus from vegetable and animal wastes through the agency of fungi and bacteria. Humus results from the amalgamation of the undecomposed portions of the vegetable and animal wastes of a properly assembled and properly managed compost heap, and the dead bodies of the fungi and bacteria which ferment these wastes. Such humus can

be looked upon as the first segment of the wheel of life. In the soil this humus undergoes two very different series of changes: (1) a portion is broken down and finally mineralised by the soil organisms with the formation of the salts needed for the work of the green leaf; (2) some of the remainder nourishes certain soil fungi which invade the active roots of the crop and live therein in partnership with the plant. Eventually the fungous threads of this mycorrhizal association are digested by the plant, by which means proteins pass from the soil to the green cells of the leaf. Similar nitrogen complexes produced by the oxidation of the proteins left by the dead bodies of soil organisms, in all probability are absorbed directly by the root hairs of the crop. The first step in the circulation of protein in Nature is thus accomplished. The next stage in this process by means of animal and human digestion is so well understood that it needs no argument. When the waste products of the animal and of the plant come together again this circulation of protein is resumed. That is what takes place in Nature—in the forest, in the prairie and in the ocean. If we copy it in our agriculture, two important consequences are realised: (1) the plant and the animal retain the fertility principle; (2) both plant and animal are able to resist the parasite. If, however, we interpose a substitution phase for the essential protein by the use of artificial nitrogenous manures, the power of reproduction is lost and the plant and the animal are compelled to retreat before the parasite.

One of the many examples from crop-production which can be quoted to establish this thesis is the cultivation of the vine. In Central Asia this crop is always manured with farmyard manure; artificials are unknown. The consequence is that the variety does not run out. It is to all intents and purposes eternal, because each generation is grown by methods laid down by Nature. Moreover, there is practically no disease. In Europe, where the crop is raised mostly on artificial manures, the variety soon runs out and insect and fungous pests have to be kept at bay by means of poison sprays.

In livestock similar results are obtained. That the nutrition of our animals is leading to difficulties in reproduction is proved by the growing incidence of the infection of the mother—mastitis, contagious abortion and other troubles associated with the breeding animal. The lower resistance to disease is indicated by the constant reappearance of a virus trouble—foot-and-mouth disease, the occurrence of which is a sure sign that something is wrong with the circulation of protein.

How can these views of disease and its prevention be put to a crucial test? By practical experience.

In the case of crops this is now being done everywhere and the results obtained support the thesis put forward in this article. I will quote one example. A few years ago Mr. A. R. Wills, of the Tadburn Nursery at Romsey, Hampshire, found that the use of chemicals in his tomato houses led to wilt disease. Three houses—three acres in extent—became badly infected. On my advice he composted the diseased hulms of these three acres, applied the compost to the same houses and grew a new tomato crop. This was free from disease. He then took up the Indore Process and gave up the use of artficials. His nursery has never looked back. It now enjoys a high reputation for quality and there is a great demand for the produce.

In the case of foot-and-mouth disease a similar crucial experiment is needed. A cattle farm should first be put in order by means of freshly prepared humus and a breed which suits the locality should then be got into good fettle by means of produce raised on the farm. A few mild foot-and-mouth cases should then be allowed to run with the herd. Two things are likely to happen. The affected animals will soon recover and the herd will either escape infection altogether, or if a few cases develop, they will rapidly cure themselves. Similar results will be obtained in such troubles as mastitis, contagious abortion, Johne's disease, tuberculosis and so forth.

*A New Policy for Veterinary Science*

When these results are obtained the veterinarian of the future will be in a position to make use of the diseases of livestock to test farming practice. If the introduction of a diseased animal on a farm leads to no new cases, then all is well with the methods employed. If infection does take place, then the complete overhaul of the methods of agriculture is called for.

It follows from the above that the current proposals for the control of animal disease by orthodox methods, such as the direct assault on the parasite, or its avoidance, by vaccines and sera, are bound to fail, because they are based on the wrong principles. All these troubles are messages from Mother Earth that things are not well. We must, therefore, give the right answer to these messengers of Nature; the underlying causes of the despatch of these missives must be removed. This can only be done by the methods above indicated—the restoration

and maintenance of soil fertility, so that the food of the animal is properly constituted This must be followed by good management.

*Soil Fertility and National Health*

So much for the relation between soil fertility and the health of crops and livestock. But what of the effect of a fertile soil on national health? How does the produce of an impoverished soil affect the men and women who have to consume it?

The difficulties in using human beings as material for experiments in nutrition are well known. These obstacles do not occur in the case of crops and livestock where the investigator has full control of his material and complete freedom in experimentation. He cannot deal with human beings in the same way. The only subjects that might conceivably be used for nutrition experiments on conventional lines are convicts. Objections to using this material for such purposes would almost certainly be raised. Even if they were not, the investigation would be dealing with life in captivity and with abnormal conditions. Any results obtained would not necessarily apply to the population as a whole.

Perhaps the chief difficulty at the moment in following up the possible connection between the produce of a fertile soil and the health of the people who have to consume it, is to obtain from well-farmed land regular supplies of such produce in a perfectly fresh condition. Except in a few cases, food is not marketed according to the way it is grown. The buyer knows nothing of how it was manured. The only way to obtain suitable material would be for the investigator to take up a piece of land and grow the food himself. This, so far as my knowledge goes, has not been done. This omission alone explains the scarcity of direct results and why so little real progress has been made in human nutrition. Most of the work of the past has been founded on the use of food material very indifferently grown. Moreover, no particular care has been taken to see that the food has been eaten fresh from its source. Such investigations therefore can have no solid foundation.

Apart from the evidence that can be gathered from nutrition experiments, is there anything to be learnt about health from agriculture itself? Can the East which, long before the Roman Empire began or America was discovered, had already developed the systems of good farming which are in full swing to-day, throw any light on the relation between a fertile soil and a healthy population? It is well known that both China and India can show large areas of well-farmed land, which for centuries have carried very large populations. Unfortunately two factors—over-population and periodic crop failures due to irregular rainfall—make it almost impossible to draw any general lessons from these countries. The population, looked at in the mass, is always recovering from one catastrophe after another. Over-population introduces a disturbing factor—long-continued semi-starvation—so powerful in its effects on the race and on the individual that any benefits arising from a fertile soil are entirely obscured.

When, however, the population of the various parts of India is examined, very suggestive differences between the races which make up its 350 million inhabitants are disclosed. The physique seen in the northern area is strikingly superior to that of the southern, eastern, and western tracts. We owe the investigation of the causes of these differences to McCarrison, who found that they corresponded with the food consumed. There is a gradually diminishing value in the food from the north to the east, south and west in respect of the amount and quality of the proteins, the quality of the cereal grains forming the staple article of diet, the quantity and quality of the fats, the mineral and vitamin content, as well as in the balance of the food as a whole.

Generally speaking the people of northern India, which include some of the finest races of mankind, are wheat eaters, the wheat being consumed in the form of thin, flat cakes made from flour, coarse but fresh-ground in a quern. All the proteins, vitamins, and mineral salts in the grain are consumed. The second most important article of diet is fresh milk and milk products—clarified butter, curds, and buttermilk; the third item is the seed of pulse crops; the fourth, vegetables and fruit. Meat, as a rule, is very sparingly eaten except by the Pathans.

Turn now to the other parts of India, east, west and south, in which the rice tracts provide the staple food. This cereal—a relatively poor grain at best—is parboiled, milled or polished, washed in many changes of water, and finally boiled. It is thereby deprived of much of its protein and mineral salts and of almost all its vitamins. In addition, very little milk or milk products are consumed, while the protein content of the diet is low both in amount and quality. Vegetables and fruit are only sparingly eaten. It is these shortcomings in their food that explain the poor physique of the peoples of the rice areas.

In order to prove that these bodily differences were due to food, McCarrison carried out ex-

periments on young growing rats. When young growing rats of healthy stock were fed on diets similar to those of the races of northern India, the health and physique of the rats were good; when they were fed on the diets in vogue in the rice areas, the health and physique of the rats were bad; when they were fed on the diets of races with middling physique, the health and physique of the rats were middling. Other things being equal, good or bad diet led to good or bad health and physique.

When the health and physique of the various northern Indian races were studied in detail the best were those of the Hunzas, a hardy, agile, and vigorous people, living in one of the high mountain valleys of the Gilgit Agency, where an ancient system of irrigated terraces has been maintained for a thousand years in a high state of fertility. There is little or no difference between the kinds of food eaten by these hillmen and by the rest of northern India. There is, however, a great difference in the way these foods are grown. The total area of the irrigated terraces of the Hunzas is small; ample soil aeration results from their construction; the irrigation water brings annual additions of fine silt produced by the neighbouring glacier; the very greatest care is taken to return to the soil all human, animal and vegetable wastes after being first composted together. Land is limited: upon the way it is looked after life depends. A perfect agriculture in which all the factors that combine to produce high quality in food, naturally results.

What of the people who live upon this produce? In *The Wheel of Health,* Wrench has gathered together much of the information available and has laid stress on their marvellous agility and endurance, good temper and cheerfulness. These men think nothing of covering the sixty miles to Gilgit on foot in one stretch, doing their business and then returning.

McCarrison, who at one period was Medical Officer to the Gilgit Agency, in his Mellon Lecture delivered at Pittsburg in 1922 on "Faulty Food in Relation to Intestinal Disorder," referred to the remarkable health of the Hunzas in the following words:—

> "During the period of my association with these people I never saw a case of asthenic dyspepsia, of gastric or duodenal ulcer, of appendicitis, of mucous collitis, of cancer. . . . Among these people the abdomen over-sensitive to nerve impressions, to fatigue, anxiety or cold was unknown. The consciousness of the existence of this part of their anatomy was, as a rule, related solely to the feeling of hunger. Indeed, their buoyant abdominal health has, since my return to the West, provided a remarkable contrast with the dyspeptic and colonic lamentations of our highly civilised communities."

A study of the races of India and of their diet, coupled with the experimental work on rats carried out by McCarrison, leaves no doubt that the greatest single factor in the production of good health is the right kind of food and the greatest single factor in the production of bad health is the wrong kind of food. Further, the very remarkable health and physique enjoyed by the Hunza hillmen appears to be due to the efficiency of their ancient system of farming.

These results suggest that the population of Great Britain should be studied and the efficiency of our food supply investigated. If the physique and health of a nation utimately depend on the fresh produce of well-farmed land, if bad farming be a factor in the production of poor physique and bad health, we must set about improving our agriculture without delay.

Two very different methods have recently been employed for testing the efficiency of the food supply of this country. In the first case (Cheshire) the population of a whole county, which includes both rural and urban areas, has been studied in the mass for a period of twenty-five years and the general results have been recorded. In the second case (Peckham) a number of families have been periodically examined with a view to throwing light on the general health and efficiency of a group of comparatively well-to-do workers in a City like London.

The methods adopted in the study of the population of Cheshire and in the publication of the results are highly original. About twenty-five years ago, the National Health Insurance Act for the Prevention and Cure of Sickness came into force. This measure has organised the close medical observation of the population for a quarter of a century. If the experience of the Panel doctors, the family doctors of the county, could be synthesized, valuable information as to the general health of the community would be available. This has been accomplished. The local Medical and Panel Committee of Cheshire, which is in touch with the 600 family doctors of the county, and is elected by them, has recorded its experience in the *Medical Testament.* They find it possible to report definite progress in the "Cure of Sickness"—the second part of the objective framed by the National Health Insurance Act. There is no doubt that we have learnt to "postpone the event of death" and this is the more remarkable in view of the rise in sickness, in short, the failure of the first part of the Act's objective. On this latter count there is no room for complacency.

"Our daily work brings us repeatedly to the same point—this illness results from a life-time of wrong nutrition." They then examine the consequences of wrong nutrition under four heads—bad teeth, rickets, anæmia, and constipation—and indicate how all this and much other trouble can be prevented by right feeding. For example, in dealing with the bad teeth of English children some striking facts are emphasised. In 1936 out of 3,463,948 school-children examined, no less than 2,425,299 needed dental treatment. That this reproach can be removed has been shown by Tristan da Cunha, where the population is fed on the fresh produce of sea and soil—fish, potatoes, and seabirds' eggs are the staple diet, with sufficient milk and butter, meat occasionally and some vegetables—all raised naturally without the help of artificial manures and poison sprays. In 1932, 156 persons examined had 3,181 permanent teeth of which 74 were carious. Imported flour and sugar have been brought in to a greater extent of late, which may account for the tendency of the teeth to deteriorate observed in 1937.

*To be concluded.*

## JOHN LIONEL STRETTON

John Lionel Stretton, who died in his nursing home at Kidderminster on February 14th at the age of 82, must have been almost the last of his generation of Bart.'s men. In 1882, when about to take up a second house appointment, he felt it his duty to leave the hospital to assist his father, Samuel Stretton, also a Bart.'s man, who practised in Kidderminster and the country around. Lionel Stretton at once was appointed surgeon to the Infirmary, the name by which the general hospital of the town was known, and for 56 years he was consulting surgeon there, performing altogether some 40,000 operations.

A handsome man of strong character, great determination and originality in technique, he soon built up an extensive practice as a general surgeon, and, in time, his services were sought far beyond Kidderminster and its surrounding districts. Patients came from abroad to consult him. Apart from his professional skill, which was so remarkable as to be on occasions almost uncanny, Stretton was a great administrator and, by his own initiative and resolute persistence, he raised in public and private appeals some £47,000, gradually converting the old Infirmary into the present Kidderminster General Hospital, where his son, J. W. Stretton, also a Bart.'s man, is senior surgeon.

He was a great admirer of the scenery of Worcestershire, and it was usual for him to take his guests for a drive to see the Clee Hills or Habberley Valley, and he would recount how at one time he kept seven horses hard at work, so extensive was his practice.

In surgery Stretton was a pioneer, although he got little credit for some of his discoveries, among them being the sterilisation of the skin by tincture of iodine before operations. Cool in emergency, kind to patients and considerate to staff, his house surgeons worshipped him. One of them contributed the following appreciation to the *Kidderminster Shuttle*:—

"By the death of John Lionel Stretton, Kidderminster has lost a beloved citizen, the Infirmary its guardian, and the medical profession a leader, who in his heyday was one of the busiest general surgeons in the Midlands.

"A man of striking leonine appearance, he never discarded the one-time hallmark of the doctor—a top-hat and frock coat. Stretton was a tireless worker, who never took a holiday. 'My work is my holiday,' he used to say, and certainly he did not seem to need one. Week by week for over fifty years he performed a number of major operations, which, to an outsider, might seem incredible. Original, dexterous, careful, and fearless as a surgeon, his results were remarkable, particularly in cancer. As his fame spread, his services were sought far beyond the county of Worcester.. A leading London surgeon saw him operate and advised him to move to Harley Street. 'Though,' he slily added, 'it won't do me much good, Lionel, if you do.' But nothing could divorce him from the Infirmary he loved, for whose welfare he slaved and for which, by his appeals, he raised considerable sums of money.

"His clear-cut opinions were strongly held and as strongly expressed. He was no respecter of persons, and it may well be that he offended some in high places, for in times of showers, honours seemed to miss him. 'My work brings its own reward,' he said, and was content.

"As an apostle of thoroughness, he impressed his staff with his own meticulous care of his patients, who adored him and refused to see anyone else.

"Although he ate and drank sparingly, he was happy to entertain at home."

## ON HEARING A LECTURE TO A LEARNED SOCIETY

Geoffrey showed us to a nicety
How schemic renes (? from anxiety)
To hypertension gave rise.
Hypertrophy is next his song
Degeneration won't be long
Fatty plague in thickened media.
Calcification next arrives
Hæmorrhage in some guise
Will call a halt ere long.
Atheroma, explained our sage
Is independent quite of age
Guiltless is Time's Sickle shown.
Dignity and Pride arose
Wearing Academic robes
Thanks proposed at closing jointure
Did but show—he'd missed the pointure.

(ANON.)

## THE RUT

Word upon word issued from his mouth and pearl upon pearl was being cast before the drowsy herd. Just as a well disciplined army moves in the inevitable measured tread or just as surely as blue mixed with yellow will produce the green, even so the tide of words ebbed and flowed until soon the essence of the words' meaning was lost and now they only formed a dull background for the scene I now describe.

I was driving a car through the wettest and muddiest of country lanes, it seemed madness to continue, but I became possessed of some peculiar determination which kept me going on to a goal I knew not where. Suddenly the engine spluttered and stopped, the car sank deeper and deeper into the mud. I procured a sack but it was of no avail—the more I tried to force the car out of the rut the deeper it became stuck. Then a voice which seemed to issue from the very depths of the rut addressed me. "This is a dream," he said, "for your instruction. The explanation is simple. You are as the car is, stuck in a rut—the more you try to get out of the rut the deeper you sink in, or at the best you merely enter another."

Before I could congratulate the voice on the profundity of his statement, or curse it for its lack of knowledge of the time and the place for such candour, I became aware that the gentle tidal background of the lecturer's words had now reached springtidal force and now they had left the realm of the subconscious and with terrifying vigour they leapt to the conscious level. With biting sarcasm they informed "the gentleman" who snored to leave the lecture theatre; how ugly people generally look, I mused, but even more so when they fix one with glassy stare. Then in a flash I recalled the dream—the rut—the way of escape—with the lightest of hearts I ran to the astonished lecturer and shook his hand in gratitude. The extraordinary had happened at last—oh, yes, they may think I'm mad, quite raving, but I have left the rut and they're still in it.

B. N. S.

## BOOK REVIEWS

PHYSIOLOGICAL PRINCIPLES IN TREATMENT, by Sir Walter Langdon-Brown, M.A., M.D., F.R.C.P., Hon. D.Sc., and Reginald Hilton, M.A., M.D., F.R.C.P. 8th Edition. Baillière, Tindall & Cox. (12s. 6d.)

For thirty-four years this book has explained the why and the wherefore of accepted modern medical treatment. Perhaps it is primarily intended for the busy practitioner, who has little time to follow recent advances, but it is of great value to the student, who is concerned firstly with principles. In fact it is eminently necessary in medicine above all sciences for the existence of such a book as this that skims off the cream of medical research during the last six years, and that it has reached its eighth is ample demonstration of its need. The reader should not look for details of the most recent research, for, as the authors remark, so often the particular work that might have been included has been discarded in the laboratory in a few years.

Changes have been made in the chapters on the pituitary hormones, treatment of gastric ulcer, nephritis, diabetes, the carotid sinus reflex and hypertension. An entirely new chapter has been included on the action of drugs which shows in how vast a manner our knowledge of their use has progressed. It is sincerely hoped that this book will continue in great demand, for it justifies its purpose in an excellent manner.

ELECTROCARDIOGRAMS, by H. Wallace Jones, M.D., F.R.C.P., and Noble Chamberlain, M.D., F.R.C.P. Second Edition. (John Wright, 5s.)

This atlas of a set of representative electrocardiograms is well known and appreciated. In this edition minor alterations have been made in the text and some better records substituted for those in the first editions. As a compact well-written little booklet on the subject this remains unsurpassed.

A SYNOPSIS OF TROPICAL MEDICINE, by Sir Philip Manson-Bahr, C.C.M.G., D.S.O., M.D., F.R.C.P. Cassell. (7/6.)

Many doctors in the Services who are now coming up against the problem of Tropical Diseases must find the books on this subject rather long-winded. This synopsis has succeeded in condensing the more important points of the subject into a comparatively small space, without producing an unreadable catalogue.

Students and Practitioners, even if they never go abroad, will be faced after the war with large numbers of ex-service patients returning from the tropics suffering from diseases with which the average doctor is unfamiliar. It is obviously necessary for everyone to know something about these tropical diseases, and this book, in my opinion, fills an important gap in the literature on the subject.

## At HILL END

On April 30th the Christian Fellowship held an open meeting at which the Rev. G. Harmon gave an address on the subject, "Has Life a Purpose?" The meeting was well attended, but those who wished to hear some proof of the existence of a purpose were disappointed because the lecturer's premises were based upon belief in the Bible. It is unfortunate that so often sincere religious people jeopardise their cause by the attitude that if you believe in God then I can prove His existence. So here, if we are prepared to believe in Purpose, then such a purpose could be demonstrated.

His evidence rested on three points: the first was drawn from the Design of the Universe. The second from the Plan of History, and the third from the Purpose in individual lives. I fail to appreciate the claim that from history one could detect the outworkings of a Divine Plan. Two centuries of Christian teaching has made man no better than the Ancient Greeks; surely there has never been an age in which men have led less Christian lives than at present. It is that man's primordial misuse of free will is more powerful than the Divine Plan? The evidence from the purpose in individual lives was well illustrated by examples both old and new. The conscientious inquirer without faith will certainly be forced to believe that the Universe is governed by some purpose or that his life has no meaning. The latter devastating conclusion makes the effort of living so unbearable that he turns to the Christian in the hope that he may find a directing force. It is a pity he is told that without an irrational faith no solution can be offered to him.

The cricket season has started rather ingloriously for our team. The first match was against the St. Albans N.F.S. They batted first and we were disappointed to get them out for 33; after all, we did want a game! The wind was soon taken out of our sails, however, when they beat us by seven runs. In the next match we were all out for about the same score as before, but we were saved from a second shameful defeat by the rain; I hope it improves our pitch! After watching us the patients feel confident that they could challenge us and give us a good run for our money.

This term the Dramatic Society is producing the naval comedy, "The Middle Watch." The feud that split the ranks of our dramatic artists now appears to have been settled, and they are working in amicable symbiosis. I am extremely sorry that the review of the last play did not appear in the last JOURNAL; this was not the result of the feud; I am no artist.

The Easter Ball was a great success. The Abernethians band was in excellent form, as were the dancers, although some of them were dancing extremely strange steps; I put this down to some other influence than the lack of technique, perhaps the same influence that made the band so good.

F. J. C.

* * * *

## "BUSMAN'S HONEYMOON"

"Busman's Honeymoon," by Dorothy L. Sayers, was presented by the Hill End Bart.'s Players on March 26th and 27th to enthusiastic audiences who enjoyed the thoroughly satisfying experience of a good play being played well.

(For "Busman's Honeymoon" is a good play.) It is not the place of this reviewer to discuss its merits as a play, but rather as a

vehicle for the Hill End Bart.'s Players. As such it was a happy choice, and the first bouquet goes to the responsible members of the Club for their sound judgment in selecting a play that offers such a balanced measure of dialogue and action. The better the play the greater is the responsibility of the players, for nothing is sadder than good scenes badly acted. The Hill End Bart.'s Players entirely justified their choice, and they carried the fast-moving intricate plot along with them to its dramatic climax.

The central character in "Busman's Honeymoon" is, of course, our old friend, Lord Peter Wimsey, the aristocrat with a taste for "Arsenic and Old Lace," or rather in this case, Donne and Detection. Michael Dickinson, who played the part, had the difficult task of winning over an audience who, owing to the popularity of Miss Sayers, had their own preconceived idea of how Lord Peter should appear. However , he soon overcame this prejudice and gave an intelligent and immaculate performance.

He was admirably supported by Miss Heather Bangert, who was both calm and graceful in the part of Harriet, his bride, and who displayed a welcome restraint of gesture.

Mr. Geoffrey Bond, as Frank Crutchley, the scheming villain of the piece, was outstanding. He was beautifully unpleasant and sustained the tempo of an exacting part throughout with skill and a fine sense of timing. One of the highlights of the play was his scene with Aggie Twitterton, admirably played by Miss Kathleen Simmons.

Comedy was provided by the amusing character of Mrs. Ruddle (Miss Jean Sawers), the Sweep (Mr. Edward Hughes) whose downfall was "corroded sut," and the cactus-loving Vicar (Mr. Peter Dallas Ross).

The official investigators Superintendent Kirk and P.C. Sellon, were played by Mr. Paddy Osborne and Mr. John Fuller, who are to be congratulated on making light work of rather heavy parts.

Mr. John Rawlins, who played the long-suffering Bunter, was perhaps a little too volatile to be quite convincing. Smaller parts were played by Mr. Kenneth Clarkson as MacBride, and Messrs. Bill Royle and Ivor Haire as the broker's men.

Mr. Gordon Bourne produced the play, and much of the success was due to his careful and considered direction.

In all, "Busman's Honeymoon" may safely be ranked as one of the Hill End Bart.'s Players' most successful ventures, and it clearly demonstrates how much the success of an amateur production depends on the choice of a suitable play. "The fault, dear Brutus, is not in our Stars"—and that, as Superintendent Kirk would say, is Shakespeare.

J. R. N.

## At CAMBRIDGE

As a result of the storm of protest that has raged around my ears since the publication of the last issue of the JOURNAL, I must make the following statement:—

Some 450 words about Bix, Boogie-woogie and Brahms published, for some unknown reason, under the heading, "at Cambridge" are by no means representative of activities here.

The Junior Abernethian Society, formed in March, is to hold its inaugural meetings this term and in addition to having a medical Brains Trust and discussions on topical matters of interest to students, we hope to hear a talk by General MacArthur, head of the R.A.M.C.

The Secretary of the Cricket Club tells me that so far this term rain has prevented all matches, except one, from being played: the only game they have had was played in a downpour, but the enthusiasts are still holding out hopes of giving us "ball-by-ball" accounts later on in the season.

The play-reading society have recently read "Dear Brutus" and "Love in a Mist," but acting has, unfortunately, had to be abandoned owing to lack of time and, it seems, lack of talent. The Boat Club are busy preparing for the May races and the Tennis Club, despite the shortage of balls, are doing good work under the guidance of their captain, D. J. E. Cheshire.

Coupons may be scarce, but when someone starts a fashion, even if it is only in collars, those who can are quick to follow suit. There are now, therefore, a select few whom so many envy so much, but the majority of us spend our time mournfully chanting, "If I only had wings; Oh, what a difference it would make to things."

M. D. S.

## CORRESPONDENCE

*To the Editor, St. Bartholomew's Hospital Journal*

Dear Sir,

In a recent letter to the Journal, Mr. A. V. Livingstone advances many reasons as to why women do not make good doctors, from which one deduces that he does not think that they should be admitted to the profession.

All these arguments, however, are rather beside the point in a discussion about whether women should be admitted to Bart.'s. Women are in the medical profession, and nothing Mr. Livingstone or anyone else can do will ever get them out again. This may or may not be a good thing, but it is not the point at issue.

Mr. Livingstone brings forward no argument against women entering Bart.'s except an admittedly personal preference. In fact those who oppose the admittance of women to Bart.'s bring forward two chief reasons in support of their attitude. These are:

1. The lack of lavatory accommodation.
2. The "damned if we'll have women in Bart.'s" attitude.

The first doesn't carry much weight. Women can take it. The second is pure selfishness. Such a dog-in-the-manger attitude on the part of a child would receive quick and well-deserved punishment from its parents. In members of a supposedly unselfish profession it would be incredible if one was not also aware of their diehard conservatism.

Bart.'s is in the eyes of the majority of its members the best medical college in Britain. Why should we deny its advantages to any who want to become doctors? In the Memorandum on Medical Education recently prepared here, the view was expressed that only stupidity or laziness should bar a person from taking up a medical career. Being born a woman is no guarantee of either stupidity or laziness, any more than masculinity is a guarantee of intelligence and energy.

At Bart.'s we have not reached the Fascist stage of shutting our doors to aspiring students on the grounds of race, colour, or creed, though I am ashamed to say that there seem to be many in this hospital who would like to see it restricted to pure blue-blooded Aryans. Let us show that such narrow-mindedness is not typical of this hospital by admitting women on the same basis as men. The unfairness expressed in the refusal to admit women is no advertisement for our great name.

We are, Sir,

Yours faithfully,

HUGH E. CLAREMONT.
E. A. J. ALMENT.
R. F. JONES.

May 9th, 1943.

148, Rosendale Road,
West Dulwich,
London, S.E.21.

*To the Editor, St. Bartholomew's Hospital Journal*

Dear Sir,

It was very interesting to read "The Madagascar Operation" in your Journal of April, 1943, and we realise for the first time that four of the M.O.'s were Bart.'s men. Knowing a fair proportion of the Field Ambulances referred to, I was always under the impression (quite wrongly if your Journal is correct) that it was an Aberdeen Field Ambulance. Certainly the majority of the O.R. came from the Aberdeen area.

To see those Light Sections and other R.A.M.C. personnel trekking along that 18 miles of dusty tracks and roads, pulling their equipment along in handcarts, escorted only by their drivers—on foot—was something to be proud of. Training and real guts got them up. Spirit and esprit de corps kept them at it, some of them for 72 hours on end, and no request for any form of assistance was ever refused. For Bart.'s to have provided three leaders of that excellent unit, and Captain Patterson, with another, is, I think, worthy of record for all time.

Yours faithfully,

R. D. STURGES,
H.G., R.N. Div.,
Home Forces.

April 18th, 1943.

(The writer is not a Scotsman.)

## *SPORTS NEWS*

The annual sector seven-a-side tournament was held at Hill End on Wednesday, April 14th. A holiday crowd assembled in bright sunshine to view the exchanges, on a ground resembling ferro-concrete in consistency.

The first match of the afternoon provided capital entertainment, the hockey club team putting up a great fight against the more experienced and well-fancied Hill End side; indeed, a feature of the game was the keen tackling of the hockey club, while a scoring dash by Holmes (worthy of his more illustrious namesake!) electrified spectators and players alike.

The match between the Bart.'s and Hill End housemen had been widely advertised for some weeks past, and from the kick-off it was clear that James Smith and his men meant business, for they were soon in the lead, and eventually won quite easily. (It is reported that skilful propaganda disseminated amongst the enemy ranks at half-time, played a significant part in undermining the morale of the Hill End residents!)

Friern, who included four of last year's winning Hill End side, were too strong for the Hill End second seven, and Bart.'s drew a bye to complete the first round.

In the first semi-final game Bart.'s defeated Hill End, but the result was in doubt till the end. Hill End scored through Fyfe in the first half, but with Mathew obtaining the ball regularly from the set scrums, Bart.'s scored twice to win by eight points to five.

Friern scored a quick eight points against the

Bart.'s Housemen, and lacking the ball from the scrums defended throughout the second half. James Smith made a determined "intruder" attack for Bart.'s, but was intercepted and shot down smartly by Corbett!

The final produced the keenest game of the afternoon. Bart.'s secured the ball from almost every scrum, but their outsides though individually threatening lacked cohesion. In the line-outs Anderson excelled, and it was through him that the Friern outsides obtained most of their few chances.

Jones (A.) opened the scoring for Bart.'s with an unconverted try, and Gibson soon levelled the scores with a long penalty goal. When Friern had the ball, the strong running of Hunt and Gibson, most ably supported by Corbett, was always dangerous, and just before the end a quick heel and swift passing movement left Corbett just enough room to go over in the corner for the winning try, thus completing an entertaining afternoon's rugger.

*Team.—Bart.'s*: R. Pitman, A. Jones, G. Bourne, J. Adams, J. G. Thompson, A. T. Glanvill, G. Mathew.

*Friern*: A. R. Corbett, J. H. Gibson, M. R. Hunt, A. Livingstone, A. R. Anderson, G. Wigglesworth, J. T. Marcroft.

RESULTS:

| | | | |
|---|---|---|---|
| Hill End Housemen | | | |
| Bart.'s Housemen | Bart.'s Housemen | | |
| Friern | | Bart.'s | |
| Hill End II. | Friern | | Friern |
| Hockey Club | | | (6—3) |
| Hill End I. | Hill End I. | Friern | |
| Bart.'s (bye) | Bart.'s | | |

## BIRTHS

HOWICK-SMITH.—On April 14th, 1943, at Cavendish Nursing House, Surbiton, to Rita (née Rumbold), wife of Dr. C. Howick-Smith, a son—Peter Francis.

# CONJOINT RESULTS

*PATHOLOGY*

Arango, R. E.
Hurt, R. W. L.
Chaudhuri, M. R.
Pragnell, C. A.
Townsend, W. H.
Gupta, H. C.
Marcroft, J. T.
Calderwood, R. W. L.
Goodall-Copestake, G.
Feldman, L.
Imossi, E. A. J.
Cooper, J. R. C.
MacPhail, R. M.
Anderson, A. R.
Hemming, M.
Freeman, A. G.
Payne, J. C. R.
Spielsinger, R.
Gabril, Y. Y.
Burkitt, E. A.
Drake, G. P.
Johnston, E. N. M.
Whitfield, D.
Ingham, W. N.
Peck, B. J.
Goodbody, R. A.
Alterman, J.
Linsell, W. D.
Lister, J.
Baldry, P. E.
Goolden, A. W. G.
Jackson, P. E.
Badock, G. B.
Zimmermann, J.
Jewson, G. M.
Chambers, R. M.
Jacobs, H. B.
Miller, K. H.

*MEDICINE*

Loveless, R.
Morgan, L. J.
Calderwood, R. W. L.
Zimmermann, J.
Boyce, R. M.
Whitfield, D.
Rey, J. H.
Stammers, F. M. G.
Potter, J. M.
Green, B.
Emtage, G. S.
Burkitt, E. A.
Drake, G. H. P.
Johnston, E. N. M.
Conway, M.
Chambers, R. M.
Davies, T. D. L.
Hanbury, W. J.
Syed, I. H.
Street, D. F.
Badock, G. B.
Morris, J. L.
Farrar, D. A. T.
Feldman, L.
Moffat, D. B.
Genese, H. N. H.
Mann, P. G.
Webb, B. J.

*SURGERY*

Middleton, H. G.
Remy, M. F.
Stephen, C. S. M.
Anderson, A. R.
Farrar, D. A. T.
Morris, J. D.
Ingham, W. N.
Mistlin, L. L.
Irving, J. K.
Rey, J. H.
Davies, W.
Dowling, M. A. C.
Watkins, P. F. A.
Reed, B. O.
Davies, T. D. L.
Thomson, W. G.
Loveless, R.
Imossi, E. A. J.
Jacobs, H. B.
MacKenzie, W.
Moffat, D. B
Amin, I. B.

*MIDWIFERY*

Morris, J. L.
Durham, P. D. A.
Jacobs, H. B.
Miller, K. H.
Jones, W. K.
Bibbings, G. E. R.
Reichenheim, P. P.
Nash, F. A.
Zimmermann, J.
Imossi, E. A. J.
Randall, K. J.
Duff, D. R.
Goodbody, R. A.
Sills, O. A.
Laidlaw, C. D'A.
Reed, B. O.
Jones, J. N. Harris
Ingham, W. N.
Peck, B. J.
MacPhail, R. M.
Banister, E. H. d'A.
Taylor, H. N.
Leverton, J. C. S.
Gould, M. G.

Diplomas were conferred on the following:—

Burkitt, E. A.
Drake, G. H. P.
Feldman, L.
Payne, J. C. R.
Morgan, L. J.
Conway, M.
Davies, T. D. L.
Hanbury, W. J.
Syed, I. H.
Irving, J. K.
Banister, E. H. d'A.
Nash, F. A.
Badock, G. B.
Zimmermann, J.
Whitfield, D.
Loveless, R.
Morris, J. L.
Moffat, D. B.
Genese, H. N. H.
Mann, P. G.
Webb, B. J.
Amin, I. B.
Taylor, H. N.
Calderwood, R. W. L.
Johnston, E. N. M.
Arango, R. E.
Street, D. F.
Farrar, D. A. T.
Rey, J. H.
Stammers, F. M. G.
Potter, J. M.
MacKenzie, W.
Durham, P. D. A.
Reichenheim, P. P.

# ANY QUESTIONS

Progress in contemporary medico-pharmaceutical research is such that the medical student must learn of products unknown to his fellows in the preceding academic year. This is a difficult task with which the production of text books is sometimes unable to keep pace.

It is one of the functions of our Medical Information Department to keep the enquiring physician informed of recent advances in the development and use of our medical specialities, and parallel with this service, we are always happy to receive enquiries from medical students. We invite you to write to us whenever you have a problem or query in which you think we can be of help.

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